UNITED STATES MARINE CORPS
Marine Forces Reserve, FMF, USMC
4400 Dauphine Street
New Orleans, Louisiana 70146-5400

ORIGINAL

ForO 5100.13
BOS
24 JUL 1996

FORCE ORDER 5100.13

From: Commander
To: Distribution List

Subj: RESPIRATORY PROTECTION PROGRAM

Ref: (a) MCO 5100.8E (Marine Corps Ground Occupational Safety and Health (OSH) Program)
(b) Title 29, Code of Federal Regulations, Part 1910.134
(c) National Institute of Occupational Safety and Health (NIOSH) Certified Equipment List (NOTAL)
(d) American National Standards Institute, Z88.2-1980 (NOTAL)
(e) DOD 6055.5-M (Occupational Health Surveillance Manual) (NOTAL)
(f) BUMEDINST 6260.16A (Isocyanate Users Medical Screening Program) (NOTAL)

Encl: (1) Definition of Terms
(2) Respiratory Protection Standing Operating Procedures Outline
(3) Hazard Identification Form
(4) Respiratory Selection Guide
(5) Respiratory Selection Matrix
(6) Work Center Respirator Guide
(7) Respiratory Fit Test and Training
(8) Individual Respirator User Card
(9) Respirator Cleaning and Service Guide

1. Purpose. To establish and implement a Respiratory Protection Program within the Marine Forces Reserve (MARFORRES) to prevent the inhalation of potentially hazardous concentrations of materials released during operations for which engineering controls are not feasible, or while such controls are being installed.

2. Cancellation. Force Order 5100.6.

3. Background. References (a) and (b) require that personnel be protected from those occupational diseases or injuries caused by breathing air containing hazardous concentrations of harmful dusts, mists, fumes, gases, and/or vapors. The primary means of control

will be by engineering control measures. When effective engineering controls are not practical, or while they are being installed, appropriate respiratory protection must be used pursuant to the requirements and instructions set forth in this Order.

4. Information

a. It is a fundamental industrial hygiene principle that Personal Protective Equipment (PPE) be utilized only as a "last resort" to control hazards to the worker. Such PPE should only be used when engineering controls cannot be used or made adequate. Due to the time and expense involved in the alterations of a work space, PPE may often be the only choice when a job must be accomplished to ensure mission readiness.

b. Not all commands will find it necessary to implement a Respiratory Protection Program. Once the need for respiratory protection has been identified however, it is mandatory that all portions of this Order be used. The only manner for a command to establish the need for respiratory protection will be by one or more of the following ways:

(1) On the recommendations of a certified Industrial Hygienist (IH) after a site evaluation has been made. It is important that all aspects of the process being evaluated be discussed with the IH to ensure correct and adequate sampling and evaluation.

(2) As required by Maintenance Instruction (MI) or other Standing Operating Procedures (SOP's).

(3) As indicated by the Material Safety Data Sheet (MSDS) when working in an enclosed environment.

c. Respirators are designed to protect the wearer only against specific substances, at certain concentrations, and only for a specific period of time. Therefore, exact matching of the respirator system with the type and concentration of contaminant and duration of work to be accomplished is mandatory. The types of respirators include:

(1) Particulate removing.

(2) Gas and vapor removing.

(3) A combination of (1) and (2).

(4) Supplied air.

d. Specific definitions of the above types can be found in enclosure (1).

e. The selection of the correct respirator is only part of the job. The respirator must also fit the wearer properly. If a leak occurs, the protection factor of the respirator is negated.

5. General Requirements

a. Only respiratory protection equipment having current approval from the National Institute of Occupational Safety and Health (NIOSH) shall be used (reference (c) pertains).

b. All personnel utilizing any form of respirator shall be placed on the Respiratory Protection Program and shall be trained and fit tested in accordance with this Order.

c. Respirators shall be issued to individual users whenever practicable. They shall be stored at a central control point and issued only by an individual that has received proper training in the identification and matching of the correct respirator to the intended use.

d. Respirators shall be used as issued. No modification or substitution of parts to the issued respirator is permitted. Any alteration or substitution will automatically void the approval of that respirator.

e. When a worker must wear a full-face respirator over corrective lenses, a special type of lens bracket must be used. This bracket is without temple pieces as they may break the seal of the mask on the face. Several respirator manufacturers offer such a device. At no time shall respirator users wear contact lenses as minute amounts of contaminants can penetrate the respirator and impregnate the contact lens causing eye irritation or damage.

f. When there is any doubt as to whether an atmosphere is Immediately Dangerous to Life and Health (IDLH), no entry shall be authorized until a determination has been made by a Gas Free Engineer or an IH.

g. At no time will a respirator of any type be issued to anyone who is not on a Respiratory Protection Program. This includes "dust mask" type respirators. Subject to the approval of the Respiratory Protection Manager, workers may use their own respirator if desired. If the command allows this, then the command must assume control of the maintenance, inspection and supervision of the respirator. As mentioned above, the user must be on a program.

6. Action

a. Commanding Officers Shall

(1) Ensure compliance with references (a), (b), and (d) by establishing an active Respiratory Protection Program as outlined in this Order, if such a program is required.

(2) Take the necessary actions to enforce the use of required PPE at both the worker and supervisor level.

(3) Ensure that a mature, capable and professional Staff Noncommissioned Officer or Noncommissioned Officer is assigned, in writing, the overall responsibility for the Respiratory Protection Program consistent with the nature and scope of the unit's mission. Where a command has multiple geographic locations, each requiring respiratory protection, the Unit Commander may assign a Respiratory Protection Manager for each location. These managers shall coordinate their efforts in concert with the Ground Safety Manager as provided for below.

(4) Provide funding for the appropriate training of the assigned manager so he or she may function as an advisor to the command on the subject of respiratory protection. Such training is available from the Naval Safety School, OSHA, or from MARFORRES.

(5) Ensure the Ground Safety Manager be provided with the authority to provide oversight inspection of the Respiratory Protection Program, its implementation and on-going effectiveness.

(6) Ensure adequate IH support is available to the command by way of an Inter Service Support Agreement (ISSA) or other means, to provide the mandatory site survey and fit-testing procedures for workers requiring respirators in the performance of their duties.

(7) Ensure adequate medical support for mandatory physicals, both base line and as required, based on exposure and nature of hazard (references (e) and (f) apply).

b. The Ground Safety Manager Shall

(1) Act as an oversight inspector in matters of respiratory protection.

(2) Advise the Respiratory Protection Manager as to problems observed during formal and informal safety inspections.

(3) Act as a central point of contact when the unit has more than one Respiratory Protection Manager as outlined in paragraph 6a(3) above.

(4) Coordinate with the Hazardous Materials Coordinator and the Respiratory Protection Manager, as needed, to ensure adequate protection for all concerned.

c. The Respiratory Protection Manager Shall

(1) Evaluate the workplace and coordinate with the area IH for the required base line survey of all operations that may pose a hazard which require the use of respirators.

(2) Ensure that, if changes in work practices result in the use of different hazardous materials, a subsequent survey be performed to identify the potential need for respirators.

(3) Publish a written Standing Operating Procedure for the Respiratory Protection Program as outlined in enclosure (2). In cases where a host command's Respiratory Protection Program requirements differ from those set forth in this Order, the more stringent requirements shall be adhered to. (A Maintenance Instruction (MI) is not deemed adequate as it may only be read by a particular work section and not by the entire unit.)

(4) Ensure the work section(s) that have been identified as needing personnel certified in the use of respiratory protection equipment, submit to the Respiratory Protection Manager or his designated representative, a Hazard Identification Form (enclosure (3)) showing the nature of the hazard and work to be done. This sheet shall be used in conjunction with the Respiratory Selection Guide (enclosure (4)) and Respiratory Selection Matrix (enclosure (5)) to complete the Work Center Respirator Guide (enclosure (6)). The Work Center Respirator Guide shall be maintained on file at the central issue point, for quick reference, as long as the hazardous condition exists. In an aviation unit, the Respiratory Protection Manager shall coordinate with the Aviation Maintenance Officer to ensure adequate coverage of all maintenance areas.

(5) Ensure that all respirator wearers are properly trained in the use, care, and fitting of respiratory protection equipment as outlined in enclosure (7), and that the individual assigned to the Respiratory Protection Program maintains his/her individual user card per enclosure (8).

(6) Ensure training is conducted for the supervisors of any personnel who require respiratory protection as outlined in enclosure (7), page 15.

(7) Where supplied air respirators are utilized, ensure compliance with air quality standards as set forth in references (b) and (d) are met.

(8) Establish a respirator cleaning and maintenance program as required. Instructions for the cleaning and maintenance of respirators are in enclosure (9) and are also available from the manufacturer.

(9) Establish a central issue point for the storage, inspection and proper issue of respirators only to those workers presenting an individual user card (enclosure (8)). Ensure the issuer has had adequate training in matching the job with the correct respiratory protection and that a current Hazard Identification Form (enclosure (3)), combined with the Work Center Respirator Guide (enclosure (6)) are on hand.

(10) Ensure that all respirator users properly inspect and fit test their respirators prior to entering the work area. Ensure that they wear the prescribed respirator properly and continuously during their presence in the hazardous environment and are aware of the warning signals of imminent respirator failure and what to do about it.

(11) Ensure that the person(s) conducting the fit-testing comply with the procedures set forth in enclosure (7).

d. The Supply Officer Shall

(1) Ensure that sufficient funds are available for procurement and maintenance of the program.

(2) Expeditiously order the types and quantities of respirators selected for use by the Respiratory Protection Manager.

(3) Ensure that, when ordering replacement components for the respirators on hand, the matching parts arrive from the same manufacturer as that of the on hand respirators. Mismatched components void the certification of the respirator.

(4) Arrange for the open purchase of respiratory equipment when the type, size, and quantity requirements cannot be satisfied through the supply system.

e. Department Heads/Supervisors Shall

(1) Ensure that personnel under their cognizance, identified as requiring respiratory protection, comply with this Order.

(2) Ensure that only qualified individuals are assigned to tasks requiring the use of respiratory protective equipment.

(3) Request advice from the Respiratory Protection Manager on respiratory protection requirements for jobs where respirators have not been specified, but where the supervisor believes it may be needed.

(4) Ensure that all personnel under their cognizance, are thoroughly briefed on the respiratory hazard(s) present in the work environment and what steps to take in case of respirator failure or emergency.

f. Individual Responsibility. Each individual user is ultimately responsible for his own respirator. Before each use, every wearer must ensure that:

(1) The respirator has no holes, cracks, or leaks. A simple positive and negative fit test as described in enclosure (7) shall be performed prior to the individual entering any hazardous atmosphere.

(2) The respirator straps are in good condition.

(3) The respirator issued is the correct one for the job. In other words, does the respirator protect the wearer from the hazards that will be encountered in the environment?

(4) The respirator issued, is in fact the one that the wearer was fit tested for. Is it the same manufacturer and the correct size?

(5) He/she is familiar with the life span criteria for the cartridge and the warning signs of imminent failure when the cartridge is no longer capable of removing the contaminant.

7. Reserve Applicability. This Order is applicable to the Marine Corps Reserve.

J. R. COHN
Chief of Staff

DISTRIBUTION: D

Copy to: BOS (5)

DEFINITION OF TERMS

ABRASIVE-BLASTING RESPIRATOR - A respirator designed to protect the wearer against inhalation of abrasive material and against impact of rebounding abrasive material.

ACTION LEVEL (AL) - An amount of concentration exactly one half the Permissible Exposure Limit (PEL).

BREATHING ZONE - The area immediately around the nose and mouth of a person. Also the oral nasal cavity of a respirator.

CANISTER - A container with a filter, sorbant, or catalyst, or any combination thereof, which removes specific contaminants from the air drawn through it.

CARCINOGEN - A substance known to cause cancer.

CARTRIDGE - A small canister.

CATALYST - A substance which converts a toxic gas or vapor into a less toxic gas or vapor.

CEILING CONCENTRATION - The concentration of an airborne substance that shall not be exceeded.

CERTIFIED RESPIRATORY - A respirator that has passed a series of tests performed by the National Institute of Occupational Safety and Health. For a respirator to maintain certification, it must be used in its entirety with only the exact parts that were tested during its original certification. (A respirator without its filters is not a certified respirator.)

CONFINED SPACE - An enclosure, such as a storage tank, process vessel, boiler, silo, tank car, pipeline, tube, duct, sewer, underground vault, tunnel, or pit, having limited means of egress and poor natural ventilation and which may contain hazardous contaminants or be oxygen deficient.

CONTAMINANT - A harmful, irritating, or nuisance material that is foreign to the normal atmosphere.

DEMAND RESPIRATOR - A form of supplied air respirator that supplies air to the wearer only when the wearer inhales, i.e. when the wearer creates a negative pressure inside of the respiratory-inlet covering.

ENCLOSURE (1)

EXHALATION VALVE - A device that allows exhaled air to leave a respirator and prevents outside air from entering through the valve.

FILTER - A media component used in respirators to remove solid or liquid particles from the inspired air.

HAZARDOUS ATMOSPHERE - Any atmosphere, either immediately or not immediately dangerous to life or health, which is oxygen deficient or which contains a toxic or disease producing contaminant exceeding the legally established permissible exposure limit (PEL) or, where applicable, the Threshold Limit Value (TLV) established by the American Conference of Governmental Industrial Hygienists (ACGIH).

HIGH-EFFICIENCY FILTER (HEPA) - A filter which removes from air 99.97% or more of monodispersed dioctyl phthalate (DOP) particles having a mean particle diameter of 0.3 micrometers.

IMMEDIATELY DANGEROUS TO LIFE OR HEALTH (IDLH) - Any atmosphere that poses an immediate hazard to life or produces irreversible debilitating effects on health (15 minutes or less).

INHALATION VALVE - A device that allows respirable air to enter a respirator and prevents exhaled air from leaving the respirator through the valve.

MAXIMUM USE LIMIT OF FILTER, CARTRIDGE, OR CANISTER - The maximum concentration of a contaminant for which an air-purifying filter, cartridge, or canister is approved for use.

NEGATIVE PRESSURE RESPIRATOR - A respirator in which the air pressure inside the respiratory-inlet covering is positive during exhalation in relation to the air pressure of the outside atmosphere and negative during inhalation in relation to the air pressure of the outside atmosphere.

ODOR THRESHOLD LIMIT - The lowest concentration of a contaminant in air that can be detected by the olfactory sense.

PARTICULATE MATTER - A suspension of fine solid or liquid particles in air, such as: dust, fog, fume, mist, smoke, or spray. Particulate matter suspended in air is commonly known as an aerosol.

PERMISSIBLE EXPOSURE LIMIT (PEL) - The legally established Time-Weighted Average (TWA) concentration or ceiling concentration of a contaminant that shall not be exceeded.

POSITIVE-PRESSURE RESPIRATOR - A respirator in which the air pressure inside the respiratory-inlet covering is positive in relation to the air pressure of the outside atmosphere during exhalation and inhalation.

PRESSURE-DEMAND - A form of respirator that allows for the wearer to select either positive pressure within the respiratory-inlet cover or on the demand setting a negative pressure. (See demand or negative pressure respirators.)

PROTECTION FACTOR (PF) - The ratio of the ambient concentration of an airborne substance to the concentration of the substance inside the respirator at the breathing zone of the wearer. The protection factor is a measure of the degree of protection provided by a respirator to the wearer.

RESPIRATOR - A device designed to protect the wearer from the inhalation of harmful atmospheres. (Also see "Certified Respirator.")

RESPIRATORY-INLET COVERING - That portion of a respirator which connects the wearer's respiratory tract to an air-purifying device or respirable gas source, or both. It may be a face piece, helmet, hood, suit, or mouthpiece/nose clamp.

SANITIZATION - The removal of dirt and the inhibiting of the action of agents that cause infection or disease.

SELF-CONTAINED BREATHING APPARATUS (SCBA) - A man-packed respirator unit that supplies breathing gas to the wearer. This style unit provides the highest protection factor but is limited by the size and weight. A further limitation is that of duration of use. The maximum duration is approximately 120 minutes.

SERVICE LIFE - The period of time that a respirator provides adequate protection to the wearer.

TIME-WEIGHTED AVERAGE (TWA) - The average concentration of a contaminant in air during a specific time period (usually 8 hours).

WINDOW INDICATOR - A device on a cartridge or canister that visually denotes the service life of the cartridge or canister.

RESPIRATORY PROTECTION STANDING OPERATING PROCEDURES OUTLINE

1. Written Standing Operating Procedures (SOP's) shall cover a complete respirator program and shall include information necessary for the proper use, training, sealing tests, issuance, inspection prior to use, monitoring, monitoring hazard, and planning for routine, non-routine emergency and rescue uses and the cleaning and storage of respirators.

2. The following outline will provide guidance in the minimum requirements that shall be met when developing a SOP for the unit's Respiratory Protection Program.

a. Selection Criteria. The incorporation of appropriate sections of the enclosures of this Order may be used to specify selection criteria.

b. Training Instructions. Enclosure (7) will provide guidance.

c. Fitting Instructions. Enclosure (7) will provide guidance.

d. Unit policy regarding contact lenses and unique fit problems.

e. Maintenance Procedures. Enclosure (9) will provide guidance.

(1) Cleaning/Disinfecting.

(2) Drying.

(3) Inspection.

(4) Repair/Replacement of parts.

(5) Storage.

f. Administrative Procedures

(1) Purchasing. Paragraph 6d of this Order, as well as sections 3 and 4 of enclosure (4) pertain.

(2) Inventory Control. (i.e. new respirators, spare parts, etc.)

ENCLOSURE (2)

(3) Issuance of correct respirators. Enclosures (4), (5) and (8) pertain.

(4) Guidance for supervisors. Paragraph 6e of this Order pertains.

(a) Surveillance of respirator use.

(b) Determination of degree of exposure.

g. Guidelines for emergency use of respirators

(1) Listing of potential hazards that may result in an emergency.

(2) Consequences that may produce an emergency.

(3) Personnel who could be exposed and what they are to do.

(4) Listing of the appropriate types of respirators to be used in case of the emergency occurring.

h. Medical Surveillance

(1) Preassignment (qualification) physical.

(2) Periodic.

i. Procedures for program evaluation

(1) Inspection checklist.

(2) Wearer follow-up.

ForO 5100.13
24 JUN 1996

HAZARD IDENTIFICATION FORM

(DATE)

From: _____
To: Respiratory Protection Manager

Subj: RESPIRATORY PROTECTION FOR IDENTIFIED HAZARD

(Circle the following and fill in the appropriate blanks below.)

HAZARD TYPE: _____

OXYGEN DEFICIENCY GAS AND VAPOR CONTAMINANTS

PARTICULATE CONTAMINANTS COMBINATION OF THE ABOVE

Is the hazard Immediately Dangerous to Life and Health (IDLH)?

(circle one) YES NO UNDETERMINED

NAME OF CONTAMINANT CONCENTRATION (If Known)

_____

(use back for additional space) SEE BACK <-(circle if you use back)

What is the process/work that is being done?

_____

_____

How long does the process take? Average: _____ Maximum: _____

How often is this process done? _____

How many personnel are exposed to the contaminated atmosphere during the course of the work? _____

The above information is submitted to facilitate initiation of a Respiratory Protection Program to cover the personnel working within my work area.

POC phone ext: _____

_____
(Signature and Rank of Section Head)

ENCLOSURE (3)

1. The following is a brief explanation of the Hazard Identification Form shown on page 1 of enclosure (3). This form may be reproduced locally for unit use.

a. Line 1 - Title.

b. Line 2 - Submission date.

c. Line 3 - From whom and what work center is form being submitted.

d. Lines 4 through 7 - Self explanatory.

e. Lines 8 and 9 - Circle the appropriate condition. (i.e. If the atmosphere is less than 19.5% oxygen, it is oxygen deficient. If you have a gas or vapor contaminant circle this one, etc.)

f. Lines 10 and 11 - The atmosphere must be evaluated for concentrations that would render it IDLH, as defined in references (a) and (b) of this Order. This evaluation is done by an Industrial Hygienist or Gas Free Engineer.

g. Lines 12 through 18 and the back of the sheet as needed - Write in the contaminant(s) and the measured concentrations. If the back of the sheet is used, circle "SEE BACK".

h. Lines 19 and 20 - Briefly describe the work being done.

i. Line 21 - Indicate the average time needed to complete the task, and also indicate the maximum time that may be required.

j. Line 22 - How often is this job done? Daily, weekly, monthly, or seldom.

k. Lines 23 and 24 - This will give an indication as to how many personnel need to be on the respiratory program for this particular task. In combination with other hazard forms, the Respiratory Protection Program Manager will have an idea of how many personnel within the unit will need respirators and all that goes along with them.

l. Lines 25 through 27 - Self explanatory.

m. Line 28 - The supervisor's telephone extension.

n. Line 29 - Self explanatory.

ForO 5100.13
24 JUN 1996

RESPIRATORY SELECTION GUIDE

Table 1

1. Matching the respirator to the job.

JOB	MATERIAL	APPROVED RESPIRATOR
Battery Charging	Acid Mists	Acid-Gas Cartridge*
Dip Tank Cleaning	Organic Solvents	Organic Vapor Cartridge*
Spray Painting	Paint Mists/ Organic Vapors	Organic Vapor/Mist Cartridge with Pre-filter*
Spray Painting	Polyurethane	Supplied Air
Acid Dip Tanks	Acid Mist	Acid-Gas Cartridge*
Wood Sanding	Nuisance Dust	Dust, Mist, Fume, Cartridge*
Metal Chipping/ Grinding	Metal Dust	Dust, Mist, Fume, Cartridge*
Welding/Brazing	Lead/Zinc	Dust, Mist, Fume, Cartridge*
Welding/Brazing	Toxic Metals/ Cadmium	High Efficiency Particulate (HEPA) Cartridge*
Asbestos Minor Work	Asbestos	Dust, Mist, Fume, Cartridge*
Silica Sand-blasting	Silica Sand	Supplied Air with Hood
Non-Silica Sand-blasting	Glass Beads	Dust, Mist, Fume, Cartridge*
Brush Painting	Organic Vapors	Organic Vapor Cartridge*
Aircraft Washing	Organic Solvents	Organic Vapor Cartridge*

*Denotes disposable type respirators available

ENCLOSURE (4)

Table 2

2. Color code for canisters and cartridges (filters) found in Title 29, Code of Federal Regulations, Part 1910.134 is as follows:

Atmospheric Contaminants Present	Color Coding on Cartridge
Acid Gases	White
Hydrocyanic Acid Gas	White with 1/2 inch green stripe
Chlorine Gas	White with 1/2 inch yellow stripe
Organic Vapor	Black
Ammonia Gas	Green
Acid gas and Ammonia Gas	Green with 1/2 inch white stripe
Carbon Monoxide	Blue
Acid Gas & Organic Vapors	Yellow
Radionuclides	Purple (HEPA) (Magenta)
Acid Gas, Organic Vapors & Ammonia Gas	Brown
Dust, Mist, Fumes	Gray Stripe along with color for other contaminant as above
All of the above contaminants	Red with 1/2 inch gray stripe

NOTE: Orange shall be used as a complete body or stripe color to represent gases not included on this table. The user will need to consult the canister label to determine the degree of protection.

Paper type filter masks will have the contaminant they are used for, written on the mask as well as a NIOSH approval number beginning with a "TC-". These masks are considered respirators and as such, anyone using them must be on a respiratory protection program and fit tested just like any other respirator. Fit testing of this type of respirator is discussed in enclosure (7).

ENCLOSURE (4)

3. Manufacturers of Approved Respirators

a. Included below is an abbreviated list of manufacturers of approved respirators. For a more complete listing, consult a current edition of National Institute of Occupational Safety and Health (NIOSH) Certified Equipment List (NOTAL). Many of the manufacturers do extensive business with the Government and as such have National Stock Numbers (NSN's) and special Government pricing. Contact the company and ask for their Government Sales Representative.

Scott Aviation
225 Erie Street
Lancaster, NY 14086
(716) 683-5100

Siebe North Co.
2000 Plainfield Road
Cranston, RI 02920
(401) 943-4400

3 M Co.
3m Center, Bldg. 223-6S-04
St. Paul, MN 55144-1000
(800) 328-1667

Mine Safety Appliances Co.
121 Gamma Dr.
RIDC Industrial Park
Pittsburgh, PA 15238
(412) 967-3000

b. Procurement. There are a number of factors involved in respirator selection and procurement which can make ordering through the military supply system impractical. Some of these factors are:

(1) The requirement to fit test a respirator prior to its being assigned to the user may require that several brands be available to ensure correct fit. A local distributor may make various models available for fit testing.

(2) The need for local product support in the areas of replacement parts, fit testing (sometimes this service is available from a local supplier), training, and additional cartridges for other contaminants found in the work place may require faster and more exact matching for the respirators on hand than is available through the supply system.

(3) The capability to upgrade respiratory equipment more quickly may be limited by the very nature of the procurement process through the supply system.

(4) The fact that the supply system is set up to deliver what is "on the shelf" as opposed to the exact equipment needed by the unit may dictate a local supplier as being more desirable.

c. Most manufacturers/suppliers of approved respirators offer reduced pricing for governmental agencies. This government rate may be at or even below the GSA cost for an item. Where needs can be satisfied via utilization of normal military supply channels, that method should be utilized.

4. Disposable Respirators. Over the last few years, more and more companies have come out with disposable respirators that will protect the user from a large portion of the contaminants encountered in the work area. The Respiratory Protection Program Manager needs to study the projected usage of respirators within his/her command and determine the viability of using disposable respirators vice the more permanent cartridge style. In a situation where respirators are used infrequently, the selection of the appropriate disposable type may be more cost effective. Several considerations must be made in making this evaluation:

a. The frequency of usage versus the shelf life limitations of the respirator.

b. The ability to reorder the exact duplicate respirator when stocks run low. Where a question of duplication comes up, the need for refit testing of a different manufacturers respirator comes into play. Remember, the supply system stocks respirators by type - rather than by name brand. As a result, the brand you receive today may not be the same brand you receive on your next order, even though the NSN is the same for both.

c. The lag time required in the ordering process. Long delays may leave the unit without adequate respiratory protection. Additionally, some units have reported receiving through the system disposable respirators that have reached the end of their shelf lives.

d. At no time shall cost come into play when dealing with the health and safety of a respirator wearer. Given equal protection, the cheaper model is the respirator of choice, but if a disposable does not afford adequate protection, then a more expensive model, i.e. permanent type respirator, will be selected.

e. The non-availability of personnel to maintain and clean the more permanent (cartridge style) respirator may dictate that disposable respirators are more desirable. This does not negate the need for a central issue/control point, however.

5. Supplied Air Respirators. Where insufficient oxygen exists to support life (oxygen deficient), or the atmosphere contains high

amounts of contamination (IDLH), entry into such spaces shall require more sophisticated respiratory protection. The use of a Supplied Air Respirators (SAR) for an oxygen deficient atmosphere and a SAR with escape provisions or a Self Contained Breathing Apparatus (SCBA) for an IDLH environment shall be mandatory. At no time shall oxygen be used in a system that has previously been used with compressed air. The following additional requirements shall be adhered to when using such respirators:

a. For oil lubricated compressors (fixed, centralized, or portable) ensure that:

(1) A high temperature alarm is in place in the discharge line to shut down the compressor and sound an alarm should the temperature exceed 275 degrees F.

(2) Continuous carbon monoxide detection equipment in the output headers or accumulating tanks is in place to shut down the compressor, sound an alarm, and vent the system when the carbon monoxide levels exceed 10 parts per million (ppm).

(3) Sorbant bed and particulate filters are installed to insure breathing air quality.

(4) The air intake for the compressor is so located as to avoid the introduction of contaminated air into the system.

(5) A regular schedule of maintenance on the compressor and filtration system is established to ensure optimum performance under design specifications and maintain a log of such maintenance.

(6) A periodic air analysis is conducted to ensure the system meets or exceeds that required by the Compressed Gas Association Commodity Specification G-7.1-1989 for Grade D breathing air. Such inspections shall be done at least semiannually.

(7) In cases where the user will be located more than a few feet from a breathable atmosphere, a receiver shall be installed in line to allow sufficient time for escape from the IDLH or oxygen deficient atmosphere should the system shut down or malfunction.

(8) A standby safety observer shall be present, outside the hazardous atmosphere, with sufficient equipment, to include Self Contained Breathing Apparatus (SCBA), to initiate a rescue of the worker should he/she be overcome. In the case of the worker being

out of sight of the safety observer, some form of communication, whether radio, voice, or signal line, shall be maintained between them at all times. The worker shall also be equipped with a safety line and harness to facilitate being pulled from the hazardous atmosphere should the need arise.

(9) All hose connections shall be non compatible with other non-breathing gas systems within the work place.

(10) A Standing Operating Procedure shall be written for all operators of breathing air compressors.

b. For non-oil lubricated compressors

(1) Ensure that the intakes of such compressors are located such that no air contaminants from the compressor exhaust or the surrounding area may enter the system.

(2) Ensure that a semiannual air analysis for the produced air is conducted.

(3) Paragraph 5a(10) of this enclosure applies.

c. For compressed air cylinder supplied systems (not SCBA)

(1) Ensure cylinders are tested and inspected in accordance with the Department of Transportation regulations as set forth in 49 CFR Part 178.

(2) Ensure that a breathing air analysis be conducted as set forth in paragraph 5a(6) of this enclosure.

(3) Ensure that the cylinders are marked as prescribed in Federal Standard BB-A-1034am June 21, 1968. "Air, Compressed for Breathing Purposes."

d. For Self Contained Breathing Apparatus (SCBA)

(1) The provisions of paragraphs 5c(1) and 5c(2) above apply.

(2) The cylinders shall be marked as prescribed in Federal Standard GG-B-00675b, April 27, 1965. "Breathing Apparatus, Self Contained."

RESPIRATORY SELECTION MATRIX

1. The selection of the correct respirator for the job is a step by step process that shall be done in conjunction with the Industrial Hygienist's survey of the hazardous environment and the careful study of the Hazard Identification Form, enclosure (3).

2. The following publications pertain to the Respirator Selection Matrix and can be referred to in part to assist in the selection process.

References

(a) OSHA Regulations, 29 CFR 1910.134 and 1910.1000, Table Z-1, Z-2, Z-3, as well as 1910.1017 and beyond.

(b) Threshold Limit Values as published by the American Conference of Governmental Industrial Hygienists (ACGIH).

(c) Warning Properties of Industrial Chemicals as published by the National Institute of Occupational Safety and Health (NIOSH) and several other sources.

(d) Effect of Solvent Vapor on Respirator Cartridge Efficiency by Gary Nelson and Charles Harder. (This information is also available from the particular manufacturer of your particular respirator.)

(e) NIOSH/OSHA Pocket Guide to Chemical Hazards.

(f) Hazardous Materials Information System (HMIS).

(g) NIOSH Certified Equipment List.

(h) ANSI Standard Z88.2 - 1980

STEP 1 - RESPIRATORY HAZARD (SAMPLE card)

Oxygen Concentration: _____%

Contaminant(s): 1 _____

2 _____

3 _____

Form: _____

ENCLOSURE (5)

ForO 5100.13
24 JUN 1996

STEP 2 - ASSEMBLE INFORMATION OF CONTAMINANT(S) (SAMPLE)

Concentration(s): 1 _____ Permissible (PEL) 1 & 2
(from IH survey) 2 _____ Exposure _____
3 _____ Limit __

Protection Factor (PF) Needed: _____
(OSHA TWA divided by the NIOSH PEL)

Skin Absorption: yes/no 1
Warning Properties: 3

Odor Threshold: 3

Eye Irritation: 3 & 5

Resp. Irritation: 3 & 5

IDLH Concentration Level: 1,2,5, & 6

Lower Flammable Limit (LFL) Concentration: 5 & 6

Poor Sorbant Efficiency: 4

Special Considerations: _____

STEP 3 - RESPIRATOR SELECTION

Select a generic respirator from Table 5 of National Institute of Occupational Safety and Health (NIOSH) Certified Equipment List (NOTAL), unless other regulations affect selection.

STEP 4 - RESPIRATOR MANUFACTURER SELECTIONS

List model and specifications of respirator (cartridge type, etc.).

ENCLOSURE (5)

ForO 5100.13
24 JUN 1996

WORK CENTER RESPIRATOR GUIDE (SAMPLE) (1)

WORK CENTER:	(2)	DATE PREPARED:	(2)
SUPERVISOR:	(3)	PREPARED BY:	(3)
PHONE EXT:	(4)	REVIEWED BY:	(4)
		APPROVED BY:	(5)

TASK	HAZARDOUS MATERIAL	TOXIC COMPONENT(S)	RESPIRATOR TYPE
			(6)

1. The following is a brief explanation of the Work Center Respirator Guide. This form may be reproduced locally for unit use.

a. Line 1 - Title.

b. Line 2 - The work center where the respirators will be used and the date the form was prepared.

c. Line 3 - The work center supervisor's name and the name of the person who prepared this sheet. This may be the Respiratory Protection Manager or the issuing NCO.

d. Line 4 - The phone number of the work center and the name of the person who has reviewed the selection guide. This will be the Respiratory Protection Manager.

e. Line 5 - The approval by the Ground Safety officer.

f. Lines 6 through ? - The person preparing the form shall fill in the information gathered from the Hazard Identification Form (enclosure (3)) under the appropriate column. The task, hazardous material and toxic contents of that material are then used to select the appropriate respirator by consulting the Respiratory Selection Matrix (enclosure (5)).

ENCLOSURE (6)

RESPIRATORY FIT TEST AND TRAINING

1. FIT TESTING. The proper fit of the respirator is the single most important factor when discussing respiratory protection. As such, fit testing must be done prior to the use of any respirator. At a minimum, a fit test shall be done at least once a year. In addition, as a significant gain of loss of weight or any facial changes from major dental work or from an accident, a new qualitative fit test is required. The three types of fit testing are: The initial fit test, also known as the negative and positive fit test, the qualitative fit test which is divided into three protocols; Isoamyl Acetate, Saccharin Solution Aerosol, and Irritant Fume, and the quantitative fit test. Each of these will be discussed in more detail as follows:

a. Initial Fit Test (Negative & Positive). This test is similar to the test performed by Marines when they put on a gas mask during NBC training. This fit test shall be performed by all wearers of respirators upon putting the respirator in place, with the exception of the single use particulate respirator (i.e. 3M 8710 and similar) styles. The single use styles do not lend themselves to a negative & positive fit test by their very nature. In such a case, a visual inspection, by the wearer, in a mirror shall be done to ensure the optimum fit.

(1) Negative Pressure Test. After putting the respirator in place on his/her face and adjusting the straps correctly, the wearer shall place his/her palms over the intake section(s) of the respirator and inhale slightly causing the respirator to collapse against the face. The wearer shall hold his/her breath for about 10 seconds and note if the respirator remains collapsed. If it does not, the wearer shall remove the respirator and inspect it for damage or improper assembly. If the respirator is found to be in proper working order, the user shall replace it, adjust the straps again and repeat the negative pressure test. If the respirator still fails to maintain negative pressure see paragraph 1a(3) of this enclosure.

(2) Positive Pressure Test. After completing the negative pressure test, the wearer shall seal off the exhaust section of the respirator and exhale slightly. There should be no evidence of outward leakage from the respirator. For some respirators, this method requires that the wearer remove the exhalation valve cover and then carefully replace it after the test, often a difficult task. Removing and replacing the cover often disturbs the respirator fit even more than does the pressure test itself. Therefore, this test should be used sparingly if it requires

removing and replacing a valve cover. The test is easy for respirators whose valve cover has a single small port that can be closed by the palm or a finger. If the wearer is able to perform the positive pressure test, and subsequently the respirator fails this portion, then the wearer shall remove the respirator and after inspecting the unit as described above, begin again with the negative pressure test.

(3) If, after repeated attempts at performing either the negative or positive portion of the initial fit test procedure, the respirator fails to maintain negative or positive pressure against the wearer's face, the wearer shall consult with his/her supervisor and be prepared to return the respirator to the issue point and request another respirator.

b. Qualitative Fit Testing (QLFT). The following procedures are found in MCO 5100.8E, Marine Corps Ground Occupational Safety and Health (OSH) Program (reference (a)) of the Order and are the only allowable qualitative fit test protocols permissible. The procedures are designed for large testing facilities and should be modified to fit the individual unit situation. The procedures must be adhered to in any case.

(1) Isoamyl Acetate Protocol

(a) Odor Threshold Screening

1 Three 1 liter glass jars with metal lids (e.g. Mason or Bell jars) are required.

2 Odor-free water (e.g. distilled or spring water) at approximately 25 degrees C shall be used for the solution.

3 The Isoamyl Acetate (IAA) (also known as isopenyl acetate) stock solution is prepared by adding 1 cc of pure IAA to 800 cc of odor free water in a 1 liter jar and shaking for 30 seconds. The solution shall be prepared new at least weekly.

4 The screening test shall be conducted in a room separate from the room used for actual fit testing. The two rooms shall be well ventilated but may not be connected to the same recirculating ventilation system.

5 The odor test solution is prepared in a second jar by placing 4 cc of the stock solution into 500 cc of odor free water using a clean dropper or pipette. Shake for 30 seconds and allow to stand for two or three minutes so that the IAA

concentration above the liquid may reach equilibrium. This solution may be used for only one day.

6 A test blank is prepared in a third jar by adding 500 cc of odor free water.

7 The odor test and the test blank jars shall be labeled 1 and 2 for jar identification. If the labels are put on lids they can be periodically dried off and switched to avoid people thinking the same jar always has the IAA.

8 The following instructions shall be typed on a card and placed on the table in front of the two test jars (i.e. 1 and 2):

> "The purpose of this test is to determine if you can smell banana oil at a low concentration. The two bottles in front of you contain water. One of these bottles also contains a small amount of banana oil. Be sure the covers are on tight, then shake each bottle for two seconds. Unscrew the lid of each bottle, one at a time, and sniff at the mouth of the bottle. Indicate to the test conductor which bottle contains banana oil."

9 The mixtures used in the IAA odor detection test shall be prepared in an area separate from where the test is performed, in order to prevent olfactory fatigue in the subject.

10 If the test subject is unable to correctly identify the jar containing the odor test solution, the IAA QLFT may not be used.

11 If the test subject correctly identifies the jar containing the odor test solution he/she may proceed to respirator selection and fit testing.

(b) Respirator Selection

1 The test subject shall be allowed to select the most comfortable respirator from a large array of various sizes and manufacturers that include at least three sizes of elastomeric half face pieces and units of at least two manufacturers (i.e. at least 6 units).

2 The selection process shall be conducted in a room apart from the fit test chamber to prevent odor fatigue. Prior to the selection process, the test subject shall be shown how to put on a respirator, how it should be positioned on the face, how to set strap tension and how to assess a "comfortable"

respirator. A mirror shall be available to assist the subject in evaluating the fit and positioning of the respirator. This may not constitute his/her formal training on respirator use, only a review.

3 The test subject should understand that he/she is being asked to select the respirator which provides the most comfortable fit for him/her. Each respirator represents a different size and shape and, if fit properly, will provide adequate protection.

4 The test subject holds each face piece up to his/her face and eliminates those which are obviously not giving a comfortable fit. Normally, selection will begin with a half-mask and if a fit cannot be found here, the subject will be asked to go to the full face piece respirators. (A small percentage of users will not be able to wear any half-mask.)

5 A record is made of the more comfortable face pieces; the most comfortable of which is donned and worn at least five minutes to assess comfort. Assistance in assessing comfort can be given by discussing the points in the paragraph below. If the test subject is not familiar with using a particular respirator, he/she shall be directed to don the mask several times and to adjust the straps each time, so that he/she becomes adept at setting proper tension on the straps.

6 Assessment of comfort shall include reviewing the following points with the test subject:

* Chin properly placed.
* Positioning of mask on nose.
* Strap tension.
* Fit across nose bridge.
* Room for safety glasses.
* Distance from nose to chin.
* Ability to talk.
* Tendency to slip
* Cheeks filled out.
* Self-observation in mirror.
* Adequate time for assessment.

7 The test subject shall conduct the conventional negative and positive fit checks. Before conducting the negative or positive pressure checks, the subject shall be told to "seat" the mask on his/her face by rapidly moving the head from side-to-side and up and down while taking a few deep breaths.

8 The subject is now ready for fit testing.

9 After passing the fit test, the test subject shall be questioned again regarding the comfort of the respirator. If it has become uncomfortable, another model of respirator shall be tried.

10 The subject shall be given the opportunity to select a different face piece and be retested if during on-the-job wear, the chosen face piece becomes unacceptably uncomfortable.

(c) Fit Test

1 The fit test chamber shall be substantially similar to a clear 55 gallon drum liner suspended inverted over a 2 foot diameter frame, so that the top of the chamber is about 6 inches above the test subject's head. The inside top center of the chamber shall have a small hook attached.

2 Each respirator used for the fitting and fit testing shall be equipped with organic vapor cartridges or offer protection against organic vapors. The cartridges or masks shall be changed at least weekly.

3 After selecting, donning, and properly adjusting a respirator, the test subject shall wear it to the fit testing room. This room shall be separate from the room used for odor threshold screening and respirator selection, and shall be well ventilated, as by an exhaust fan or lab hook, to prevent general room contamination.

4 A copy of the following test exercise and Rainbow (or equally effective) Passage shall be taped to the inside of the test chamber:

TEST EXERCISE

1. "Normal breathing."

2. "Deep breathing." Be certain breaths are deep and regular.

3. "Turning head from side-to-side." Be certain movement is complete. Alert the test subject not to bump the respirator on the shoulders. Have the test subject inhale when his/her head is at either side.

4. "Nodding head up-and-down." Be certain motions are complete and made about every second. Alert the test subject not to bump the respirator on his/her chest. Have the test subject inhale when his/her head is in the fully up position.

5. "Talking." Talk aloud and slowly for several minutes. The following passage is called the Rainbow Passage. Reading it will result in a wide range of facial movements, and thus be useful to satisfy this requirement. Alternative passages which serve the same purpose may also be used.

RAINBOW PASSAGE

"When the sunlight strikes raindrops in the air, they act like a prism and form a rainbow. The rainbow is a division of white light into many beautiful colors. These take the shape of a long round arch, with its path high above, and its two ends apparently beyond the horizon. There is, according to legend, a boiling pot of gold at one end. People look, but no one ever finds it. When a man looks for something beyond his reach, his friends say he is looking for the pot of gold at the end of the rainbow."

6. "Normal breathing"

5 Each test subject shall wear his/her respirator for at least 10 minutes before starting the fit test.

6 Upon entering the test chamber, the test subject shall be given a 6 inch by 5 inch piece of paper towel or other porous absorbent single ply material, folded in half and wetted with .75 cc of pure IAA. The test subject shall hang the wet towel on the hook at the top of the chamber.

7 Allow two minutes for the IAA test concentration to be reached before starting the test exercises. This would be an appropriate time to talk with the test subject, to explain the fit test, the importance of his cooperation, the purpose for the head exercises, or to demonstrate some of the exercises.

8 Each exercise described in 1b(1)(c)4 on page 5 of this enclosure shall be performed for at least one minute.

9 If at any time during the test, the subject detects the banana-like odor of IAA, he/she shall quickly exit from the test chamber and leave the test area to avoid olfactory fatigue.

10 Upon returning to the selection room, the subject shall remove the respirator, repeat the odor sensitivity test, select and put on another respirator, return to the test chamber, etc. The process continues until a respirator that fits well has been found. Should the subject sensitivity test fail, the subject shall wait about 5 minutes for sensitivity to return.

11 If a person cannot be fitted with the selection of half-mask respirator, include full face piece models in the selection process. When a respirator is found that passes the test, its efficiency shall be demonstrated for the subject by having him/her break the face seal and take a breath before exiting the chamber.

12 As the test subject leaves the chamber he/she shall remove the saturated towel, returning it to the test conductor. To keep the area from becoming contaminated, the used towels shall be kept in a self-sealing bag. There is no significant IAA concentration buildup in the test chamber from subsequent tests.

13 Persons who have successfully passed this fit test may be assigned the use of the tested respirator in atmospheres with up to 10 times the PEL of airborne lead. In other words this IAA protocol may be used to assign a protection factor no higher than 10.

(2) Saccharin Solution Aerosol Protocol. This test is used primarily for the single use respirator fit tests but may be used for others as well.

(a) Taste Threshold Screening

1 Threshold screening as well as fit testing employees shall use an enclosure about the head and shoulders that is approximately 12 inches in diameter by 14 inches high with at least the front portion clear and that allows free movement of the head when a respirator is worn. (An enclosure substantially similar to the 3M hood assembly of part numbers FT 14 and FT 15 combined is adequate.)

2 The test enclosure shall have a three-quarter inch hole in front of the subject's nose and mouth area to accommodate the nebulizer nozzle.

3 The entire screening and testing procedure shall be explained to the test subject prior to the conduct of the screening test.

4 The test subject shall don the test enclosure. For the threshold screening test, he/she shall breathe through his/her open mouth with tongue extended.

5 Using a DeVilbiss Model 40 Inhalation Medication Nebulizer, the test conductor shall spray the threshold check solution into the enclosure. This nebulizer shall be clearly marked to distinguish it from the fit test solution nebulizer or equivalent.

6 The threshold check solution consists of 0.83 grams of sodium saccharin, USP in water. It can be prepared by adding 1 cc of the test solution (see 1b(2)(c)6 on page 9 of this enclosure) to 100 cc of water.

7 To produce the aerosol, the nebulizer bulb is firmly squeezed so that it collapses completely. Then, it is released and allowed to fully expand.

8 Ten squeezes are repeated rapidly and then the test subject is asked whether the saccharin can be tasted.

9 If the first response is negative, ten more squeezes are repeated rapidly and the test subject is again asked whether the saccharin is tasted.

10 If the second response is negative, ten more squeezes are repeated rapidly and the test subject is again asked whether the saccharin is tasted.

11 The test conductor will take note of the number of squeezes required to elicit a taste response.

12 If the saccharin is not tasted after 30 squeezes (Step 9 above), the test subject may not perform the saccharin fit test.

13 If a taste response is elicited, the test subject shall be asked to take note of the taste for reference in the fit test.

14 Correct use of the nebulizer means that approximately 1 cc of liquid is used at a time in the nebulizer body.

15 The nebulizer shall be thoroughly rinsed in water, shaken dry, and refilled at least each morning and afternoon or at least every four hours.

(b) Respirators shall be selected as described in section 1b(1)(b)1 on page 3 of this enclosure, except that each respirator shall be equipped with a particulate filter cartridge.

(c) Fit Test

1 The fit test uses the same enclosure described in 1b(2)(a)1 and 2 on pages 7 and 8 of this enclosure.

2 Each test subject shall wear his/her respirator for at least 10 minutes before starting the fit test.

3 The test subject shall don the enclosure while wearing the respirator selected in section (b) above. This respirator shall be properly adjusted and equipped with a particulate filter cartridge.

4 The test subject may not eat, drink (except plain water), or chew gum for 15 minutes before the test.

5 The second DeVilbiss Model 40 Inhalation Medication nebulizer is used to spray the fit test solution into the nebulizer. This nebulizer shall be clearly marked to distinguish it from the screening test solution nebulizer or equivalent.

6 The fit test solution is prepared by adding 83 grams of sodium saccharin to 100 cc of warm water.

7 As before, the test subject shall breathe through the open mouth with tongue extended.

8 The nebulizer is inserted into the hole in front of the enclosure and the fit test solution is sprayed into the enclosure using the same technique as for the taste threshold screening and the same number of squeezes required to elicit a taste response in the screening. (See 1b(2)(a)8 on page 8 of this enclosure.)

9 After generation of the aerosol, the test subject shall be instructed to perform the following exercise for one minute each:

TEST EXERCISE

1. Normal breathing.

2. Deep Breathing. Be certain breaths are deep and regular.

3. Turning head from side-to-side. Be certain movement is complete. Alert the test subject not to bump the respirator on the shoulders. Have the test subject inhale when his/her head is at either side.

4. Nodding head up-and-down. Be certain motions are complete and made about every second. Alert the test subject not to bump the respirator on the chest. Have the test subject inhale when his/her head is in the fully up position.

5. Talking. Talk aloud and slowly for several minutes. Use the Rainbow Passage (as listed) or equivalent.

10 Every 30 seconds, the aerosol concentration shall be replenished using one-half the number of squeezes as initially placed in the test chamber.

11 The test subject shall so indicate to the test conductor if at any time during the fit test the taste of saccharin is detected.

12 If the saccharin is detected the fit is deemed unsatisfactory and a different respirator shall be tried.

13 Successful completion of the test protocol shall allow the use of the tested respirator in contaminated atmospheres up to 10 times the PEL. In other words this protocol may be used to assign protection factors no higher than ten.

(3) Irritant Fume Protocol. This protocol is the most desirable test in that the test subject can not conceal the fact that there is a leak in the respirator.

(a) Respirators shall be selected as described in section 1b(1)(b) on page 3 of this enclosure, except that each respirator shall be equipped with a high efficiency filter cartridge.

(b) Fit Test

1 The test subject shall be allowed to smell a weak concentration of the irritant smoke to familiarize him/her with its characteristic odor.

2 The test subject shall properly don the respirator selected, and wear it for at least 10 minutes before starting the fit test.

3 The test conductor shall review this protocol with the test subject before testing.

4 The test subject shall perform the conventional negative pressure and positive pressure fit checks. Failure of either check shall be cause to select an alternate respirator.

5 Break both ends of a ventilation smoke tube containing stannic oxychloride, such as the MSA part No. 5645 or equivalent. Attach a short length of tubing to one end of the smoke tube. Attach the other end of the smoke tube to a low pressure air pump set to deliver 200 milliliters per minute.

6 Advise the test subject that the smoke can be irritating to the eyes and instruct him/her to keep his/her eyes closed while the test is performed.

7 The test conductor shall direct the stream of irritant smoke from the tube towards the face seal area of the test subject. The test conductor shall begin at least 12 inches from the face piece and gradually move to within one inch, moving around the whole perimeter of the mask.

8 The test exercises shall be performed as specified in 1b(2)(c)9 on page 10 of this enclosure, with the minor adjustment of having the test subject during the talking phase of the exercise count backwards from 100 rather than read the Rainbow Passage.

9 If the irritant smoke produces an involuntary reaction (cough) by the test subject, the test conductor shall stop the test. In this case the test respirator is rejected and another respirator shall be selected.

10 Each test subject passing the smoke test without evidence of a response shall be given a sensitivity check of the smoke from the same tube to determine whether he/she reacts to the smoke. Failure to evoke a response shall void the fit test.

11 Steps 4, 7, and 8 of this protocol shall be performed in a location with exhaust ventilation sufficient to prevent general contamination of the testing area by the irritant smoke.

12 Respirators successfully tested by the protocol may be used in contaminated atmospheres up to ten times the PEL. In other words this protocol may be used to assign a protection factor not exceeding 10.

c. Quantitative Fit Testing. Due to the type of calibration and measuring equipment required of quantitative fit testing, only a laboratory established for this purpose will do this type of fit testing.

2. TRAINING. The supervisor, the person issuing respirators, and the respirator wearers shall be given adequate training by a qualified person(s) to ensure the proper use of respirators. Written records shall be kept of the names of persons trained and the dates when training occurred. Page 15 of this enclosure pertains.

a. Training of Supervisors. A supervisor, who oversees the work of one or more personnel who wear respirators as part of that work, shall be given adequate training to ensure the proper use of the respirators. Supervisor training shall include but shall not be limited to the following subjects:

(1) The basic respiratory protection practices set forth in this Order.

(2) The nature and extent of respiratory hazards to which persons under his/her supervision may be exposed.

(3) The principles and criteria of selecting respirators.

(4) The training of respirator wearers.

(5) The issuance of respirators.

(6) The inspection of respirators.

(7) The use of respirators, including its monitoring.

(8) The maintenance and storage of respirators.

(9) The regulations concerning respirator use.

b. Training of Person(s) Issuing Respirators. Personnel assigned the task of issuing respirators to persons who must wear respirators for protection against harmful atmospheres shall be given adequate training to ensure that the correct respirator is issued for each application in accordance with the unit's written standing operating procedures. Enclosures (2) and (6) pertain.

c. Training of Respirator Wearers. To ensure the proper and safe use of a respirator, the minimum training of each respirator wearer shall include the following elements:

(1) The reason(s) for the need for respiratory protection.

(2) The nature, extent, and effects of respiratory hazards to which the person may be exposed.

(3) An explanation of why engineering controls are not being applied or are not adequate, and of what effort is being made to reduce or eliminate the need for respirators.

(4) An explanation of why a particular type of respirator has been selected for a specific respiratory hazard.

(5) An explanation of the operation, and the capabilities and limitations, of the respirator selected.

(6) Instruction in inspecting, donning, checking the fit of, and wearing the respirator.

(7) An opportunity for each respirator wearer to handle the respirator, learn how to don and wear it properly, check the seals, wear it in a safe atmosphere, and wear it in a test atmosphere.

(8) An explanation of how maintenance and storage of the respirator is carried out.

(9) Instructions in how to recognize and cope with emergency situations.

(10) Instructions as needed for special respirator use.

(11) Regulations concerning respirator use.

d. Wearing Instructions and Training. Wearing instructions and training, including practice demonstrations, shall be given to each respirator wearer and shall cover:

(1) Preliminary inspection of the respirator prior to donning.

(2) Donning, wearing, and removing the respirator.

(3) Adjusting the respirator so that its respiratory-inlet covering is properly fitted on the wearer and so that the respirator causes a minimum of discomfort to the wearer.

(4) The manner in which the wearer shall do a negative and positive fit test prior to entering a hazardous atmosphere.

(5) Allowing the respirator wearer to wear the respirator in a safe atmosphere for an adequate period of time to ensure that the wearer is familiar with its operational characteristics.

(6) Providing the respirator wearer an opportunity to wear the respirator in a test atmosphere to demonstrate that the respirator provides protection to the wearer.

(7) Post use inspection and cleaning prior to returning the respirator to the issue point.

e. Retraining. Each respirator wearer shall be retrained at least annually.

3. RECORD KEEPING. The following fit test and training record form may be reproduced locally and shall be maintained for each respirator wearer. This form shall be placed in a "transferred" file and maintained for a period of 5 years (unless a longer period is required by other regulation) after the wearer has left the unit.

ForO 5100.13
24 JUN 1996

(INSERT UNIT HEADING HERE)

RESPIRATORY FIT TEST/TRAINING RECORD (SAMPLE)

PERSONAL DATA

Name:_____ Rank:_____
(please print) (Last, First M.I.)
SSN:_____ DOB:_____ Date of Physical:_____
(dd/mm/yy) (dd/mm/yy)

Work Center:_____Phone:_____
Supervisors Name and Rank:_____

HISTORY SECTION

Have you ever worn a respirator before? _____YES _____NO
If YES, have you had any difficulties while wearing it? (Describe)

_____

_____

Have you ever had or do you have any of the following:

Lung disease.....	YES NO	Sensation of smothering.....	YES NO
Heart trouble.....	YES NO	History of Faintness or Seizures.....	YES NO
Shortness of Breath...	YES NO		
Wheezing.....	YES NO	Heat exhaustion/stroke.....	YES NO
Defective hearing.....	YES NO	High blood pressure.....	YES NO
Ruptured ear drum.....	YES NO	Defective vision.....	YES NO
Diabetes.....	YES NO	Contact lenses or glasses.....	YES NO
Any skin problems.....	YES NO	Are you taking any medication.	YES NO

COMMENTS:_____

_____

_____

MEDICAL STAFF CERTIFICATION

The above named person is/is not qualified to wear a respirator.

COMMENTS:_____

_____

_____

_____ _____
(Name, Rank and Title) (Signature and Date)

(FORM CONTINUED ON THE REVERSE SIDE)

ENCLOSURE (7)

ForO 5100.13
24 JUN 1996

Fill Out this Section of Form at End of Training

QUESTION	ANSWERS YES	NO
Are you physically fit to wear respirators?		
Have you received instruction on:		
A. Proper Wearing of Respirators?		
B. Care and Cleaning of Respirators?		
C. Uses and Limitations of Respirators?		
D. Health Hazards of Your Job?		
E. Uses of Air-fed Respirators?		

Initial Test: (Negative/Positive) Good Bad

Type of Fit test performed: (circle as appropriate)

A. Qualitative: IAA Saccharin Irritant Smoke

B. Quantitative: (attach test results supplied by test facility)

Respirator(s) that fit without leaks:

MANUFACTURER	MODEL	SIZE

(IF NONE FIT, SO STATE AND THE REASON WHY.)

Unusual Comments or Conditions: _____

Date of Respirator Fit Test/Training _____, _____
(dd/mm/yy) (Instructor's Name)

_____
(Respirator Wearer's Signature) (Date)

ENCLOSURE (7)

INDIVIDUAL RESPIRATOR USER CARD

1. The following card may be reproduced locally and shall be used to identify those personnel who have been assigned to the Respiratory Protection Program. No one shall be issued a user card without first having the required physical screening, training and fit testing as outlined in this Order. At no time shall anyone be issued a respirator without presenting this card, thereby insuring compliance with the intent of this Order.

(SAMPLE)

RESPIRATOR USER CARD

NAME RANK

WORK CENTER

ISSUED BY DATE

THIS IS TO CERTIFY THAT THE ABOVE NAMED INDIVIDUAL HAS A CURRENT RESPIRATOR USERS PHYSICAL EXAM, HAS BEEN TRAINED, AND HAS BEEN FIT TESTED IN THE RESPIRATORS LISTED ON THE REVERSE OF THIS CARD.

(SIDE 1)

MAKE	MODEL#	TYPE	SIZE	INIT

VOID IF LAMINATED EXPIRATION DATE: ___

(SIDE 2)

2. A brief description of the above card is as follows:

SIDE ONE

a. Line 1 - Title.

b. Line 2 - Name (Last, First, M.I.), Rank.

c. Line 3 - Work Center.

d. Line 4 - Issued By: (Respiratory Protection Program Manager).

e. Line 5 - Certification Statement.

ENCLOSURE (8)

SIDE TWO

a. Lines 1 through 5 - A listing of manufacturer, model, type, and size of respiratory equipment that has been assigned to the user. The type refers to 1/4, 1/2, or full face piece mask.

NOTE: Each entry must be initialed by the issuer to validate entry.

b. Line 6 - "Void if Laminated" and Expiration Date (annual renewal).

ForO 5100.13
24 JUN 1936

RESPIRATOR CLEANING AND SERVICE GUIDE

1. A program for the maintenance of respirators shall include the following information. This information shall be tailored to the types of respirators on hand and shall be modified if other styles are placed into use. It should be apparent that when only disposable respirators are on hand, the cleaning and service information can be reduced.

a. Cleaning and Sanitizing. Each respirator shall be cleaned and sanitized to ensure that the respirator wearer is provided with a clean and sanitary respirator at all times. A respirator issued for other than continuous personal use by a particular individual, such as with routine, non-routine, emergency, or rescue use, shall be cleaned and sanitized after each use.

b. Inspection for Defects

(1) Each respirator shall be inspected routinely before and after use. A respirator shall be inspected by the user immediately prior to each use to ensure that it is in proper working condition and is in fact the same manufacturer, type and sized unit that the wearer was fit tested for.

(2) Each respirator stored for emergency or rescue use shall be inspected at least monthly. Respirator inspection shall include a check for tightness of connections; for the condition of the respiratory-inlet covering, head harness, valves, connecting tubes, harness assemblies, filter, cartridges, canister, end-of-service-life indicator, and shelf life date(s); and for the proper function of regulators, alarms, and other warning systems.

(3) Each rubber or other elastomeric part shall be inspected for pliability and signs of deterioration. Each air and oxygen cylinder shall be inspected to ensure that it is fully charged according to the manufacturer's instructions. Compressed gas cylinders must also be checked for current test dates in accordance with DOT requirements.

(4) A written record of inspection dates, findings, and remedial actions shall be kept for each respirator. These records shall be maintained until the respirator is permanently removed from service. A respirator log book will suffice for this requirement.

ENCLOSURE (9)

c. Repair. Replacement of parts or repairs shall be done only by persons trained in proper respirator assembly and correction of possible respirator malfunctions and defects. Replacement parts shall be only those designed for the specific respirator being repaired. Reducing or admission valves, regulators, and alarms shall be returned to the manufacturer or a trained technician for repair or adjustment. Instrumentation for valve, regulator, and alarm adjustment and tests must be approved by the valve, regulator, or alarm manufacturer. In the case of disposable respirators, no repairs are done whatsoever.

d. Storage. Respirators shall be stored in a manner that will protect them against dust, sunlight, heat, extreme cold, excessive moisture, or damaging chemicals. Each respirator shall be properly maintained to retain its original shape and effectiveness. Respirators shall not be stored in such places as lockers or tool boxes unless they are protected from the above. Emergency and rescue-use respirators that are placed in work areas shall be quickly accessible at all times, and the storage cabinet or container in which they are stored shall be clearly marked.

2. Each manufacturer of respirators will have written information concerning his particular equipment. Utilize this literature to expand the SOP for the unit's particular respirators. It is suggested that copies of the manufacturer's literature on cleaning, spare parts, storage and other maintenance information be included as part of the SOP.